

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A group-III nitride semiconductor light-emitting diode comprising at least a first conduction-type single crystal substrate provided with a first conduction-type back-surface ohmic electrode on a back surface thereof, a buffer layer comprising a boron phosphide (BP)-based material on a front surface of said single crystal substrate, a gallium nitride (GaN)-based group-III nitride crystal layer having a light-emitting part of hetero-junction structure on said buffer layer, and a window layer comprising an electrically conducting transparent oxide crystal layer on said group-III nitride crystal layer, wherein at least a second conduction-type surface ohmic electrode conductive with said window layer is between the surface of said group-III nitride crystal layer and said window layer and comes into contact with the surface of said group-III nitride crystal layer, a pad electrode for wire bonding is disposed on the center of the upper surface of said window layer, said second conduction-type surface ohmic electrode is composed of a plurality of electrodes ~~and does not exist below said pad electrode~~ which are disposed on the surface of the region other than the projective region of the pad electrode on said group-III nitride crystal layer, and said window layer covers and is in contact with the surface of said group-III nitride crystal layer on the entire projective region of the ~~below said pad electrode~~.

2. (previously presented): The group-III nitride semiconductor light-emitting diode as claimed in claim 1, wherein said second conduction-type surface ohmic electrodes are disposed in a periphery of said pad electrode.

3. (previously presented): The group-III nitride semiconductor light-emitting diode as claimed in claim 1 or 2, wherein said second conduction-type surface ohmic electrodes are disposed at a bilaterally symmetric position with respect to the center of said pad electrode.

4. (previously presented): The group-III nitride semiconductor light-emitting diode as claimed in claim 1 or 2, wherein said second conduction-type surface ohmic electrodes are disposed at isometric positions from the center of said pad electrode.

5. (previously presented): The group-III nitride semiconductor light-emitting diode as claimed in claim 1 or 2, wherein said second conduction-type surface ohmic electrodes are composed of a plurality of electrodes disposed at equal intervals.

6. (previously presented): The group-III nitride semiconductor light-emitting diode as claimed in claim 1 or 2, wherein said second conduction-type surface ohmic electrodes are disposed in an open light-emitting region other than a projective region of the pad electrode on the surface of said group-III nitride crystal layer.

7. (original): The group-III nitride semiconductor light-emitting diode as claimed in claim 6, wherein a sum of areas of second conduction-type surface ohmic electrodes is from 5 to 30% of a total area of the open light-emitting region.

8. (withdrawn): The group-III nitride semiconductor light-emitting diode as claimed in claim 1 or 2, wherein the group-III nitride crystal layer in contact with said second conduction-type surface ohmic electrode comprises gallium phosphide nitride represented by $\text{GaN}_{1-x}\text{P}_x$ wherein $0 < x < 1$.

9. (withdrawn): A light-emitting diode lamp comprising the group-III nitride semiconductor light-emitting diode claimed in claim 1 or 2, a mount lead and an inner lead.

10. (withdrawn): A light source comprising the light-emitting diode lamp claimed in claim 9.

11. (currently amended): An electrode for group-III nitride semiconductor light-emitting diodes for a group-III nitride semiconductor light-emitting diode comprising at least a gallium nitride (GaN)-based group-III nitride crystal layer having a light-emitting part of a hetero-junction structure, and a window layer comprising an electrically conducting transparent oxide crystal layer provided on said group-III nitride crystal layer, wherein at least a surface ohmic electrode conductive with said window layer is between the surface of said group-III nitride crystal layer and said window layer and comes into contact with the surface of said group-III nitride crystal layer, a pad electrode for wire bonding is disposed on the center of the upper surface of said window layer, said surface ohmic electrode is composed of a plurality of electrodes ~~and does not exist below said pad electrode~~ which are disposed on the surface of the region other than the projective region of the pad electrode on said group-III nitride crystal layer, and said window layer covers and is in contact with the surface of said group-III nitride crystal layer ~~below said pad electrode~~ on the entire projective region of the pad electrode.

12. (previously presented): The electrode for group-III nitride semiconductor light-emitting diodes as claimed in claim 11, wherein said surface ohmic electrodes are disposed at a position in a periphery of said pad electrode.

13. (previously presented): The electrode for group-III nitride semiconductor light-emitting diodes as claimed in claim 11 or 12, wherein said surface ohmic electrodes are disposed at a bilaterally symmetric position with respect to the center of said pad electrode.

14. (previously presented): The electrode for group-III nitride semiconductor light-emitting diodes as claimed in claim 11 or 12, wherein surface ohmic electrodes are disposed at isometric positions from the center of said pad electrode.

15. (previously presented): The electrode for group-III nitride semiconductor light-emitting diodes as claimed in claim 11 or 12, wherein said surface ohmic electrodes are composed of a plurality of electrodes disposed at equal intervals.

16. (previously presented): The electrode for group-III nitride semiconductor light-emitting diodes as claimed in claim 11 or 12, wherein said surface ohmic electrodes are disposed in an open light-emitting region other than a projective region of the pad electrode on the surface of said group-III nitride crystal layer.

17. (original): The electrode for group-III nitride semiconductor light-emitting diodes as claimed in claim 16, wherein a sum of areas of said surface ohmic electrodes is from 5 to 30% of a total area of the open light-emitting region.

18. (withdrawn) The electrode for group-III nitride semiconductor light-emitting diodes as claimed in claim 11 or 12, wherein the group-III nitride crystal layer in contact with said

21 surface ohmic electrodes comprises gallium phosphide nitride represented by $\text{GaN}_{1-X}\text{P}_X$ wherein $0 < X < 1$.

19. (currently amended): A method for producing an electrode for group-III nitride semiconductor light-emitting diodes, comprising

forming a plurality of surface ohmic electrodes in contact with a surface of a gallium nitride (GaN)-based group-III nitride crystal layer having a light-emitting part of hetero-junction structure,

then covering the surface of said group-III nitride crystal layer and said surface ohmic electrodes to form a window layer comprising an electrically conducting transparent oxide crystal layer conductive with said surface ohmic electrodes, and

then forming a pad electrode for wire bonding on a center of the upper surface of said window layer conductive with said window layer, wherein said surface ohmic electrodes ~~do not exist below said pad electrode~~ which are disposed on the surface of the region other than the projective region of the pad electrode on said group-III nitride crystal layer, and said window layer covers and is in contact with the surface of said group-III nitride crystal layer ~~below said pad electrode~~ on the entire projective region of the pad electrode.

20. (original): The method for producing an electrode for group-III nitride semiconductor light-emitting diodes as claimed in claim 19, wherein the pad electrode is formed on the group-III nitride crystal layer through a window layer comprising an electrically conducting transparent oxide crystal layer so that the electrically conducting transparent oxide crystal layer is not present on the surface of the pad electrode used for wire bonding.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 09/881,782

Q61741

21. (canceled).

22. (canceled).

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 09/881,782

Q61741

AMENDMENTS TO THE DRAWINGS

The Examiner approved the proposed drawing corrections filed October 25, 2002.

Submitted herewith is one (1) replacement sheet of drawings with Fig. 1 and Fig. 2 labeled as
Prior Art.

Attachment: Replacement Sheet